ICE PROTECTION HWG STATUS

PRESENTATION TO ARAC TAEIG

MARCH 28, 2001

Handout 18

15TH IPHWG MEETING HELD AT RENO, JAN 15 - 19, 2001

- **Completed Task 1 Operations Rule Proposal documents to the point of release to TAEIG.**
- **Completed the report for TAEIG on status and recommendations for future plans on Task 2.**

Task 1. As a short-term project, consider the need for a regulation that requires installation of ice detectors, aerodynamic performance monitors, or another acceptable means to warn flight crews of ice accumulation on critical surfaces requiring crew action (regardless of whether the icing conditions are inside or outside of Appendix C of 14 CFR Part 25). Also consider the need for a Technical Standard Order for design and/or minimum performance specifications for an ice detector and aerodynamic performance monitors. Develop the appropriate regulation and applicable standards and advisory material if a consensus on the need for such devices is reached.

15TH IPHWG MEETING

THE DRAFT OPERATING RULE AND AC WERE PROVIDED TO THE FAA TECHNICAL WRITERS BY THE IPHWG ON JUNE 5, 2000

THE DRAFT NPRM AND AC WERE RETURNED TO THE GROUP AFTER PRELIMINARY FAA TECHNICAL AND LEGAL REVIEW ON OCT 2, 2000

THE DOCUMENTS HAD MANY CHANGES AND COMMENTS INCLUDING A COMPLETE REWRITE OF THE PROPOSED RULE LANGUAGE

A REVIEW OF THE NPRM DOCUMENT WAS COMPLETED DURING THE 14TH IPHWG MEETING

THE NPRM AND AC DRAFTS WERE COMPLETED DURING THE 15TH MEETING AND TRANSMITTED TO TAEIG

- DISSENTING POSITIONS REMAIN ON TWO POINTS AND ARE DOCUMENTED

THE IPHWG REQUESTS THAT TAEIG TRANSMIT THE DOCUMENTS TO FAA FOR FORMAL LEGAL AND ECONOMIC REVIEW

Task 2. Review National Transportation Safety Board recommendations A-96-54, A-96-56, and A-96-58, and advances in ice protection state-of-the-art. In light of this review, define an icing environment that includes supercooled large droplets (SLD), and devise requirements to assess the ability of aircraft to safely operate either for the period of time to exit or to operate without restriction in SLD aloft, in SLD at or near the surface, and in mixed phase conditions if such conditions are determined to be more hazardous than the liquid phase icing environment containing supercooled water droplets. Consider the effects of icing requirement changes on 14 CFR part 23 and part 25 and revise the regulations if necessary. In addition, consider the need for a regulation that requires installation of a means to discriminate between conditions within and outside the certification envelope.

15TH IPHWG MEETING

THE DIFFICULTIES ENCOUNTERED WITH THIS TASK HAVE BEEN REPORTED AT PREVIOUS TAEIG MEETINGS

THE GROUP WAS GIVEN THE FOLLOWING ACTION ITEM AT THE MARCH 2000 TAEIG MEETING

> **ICE PROTECTION HWG TO PREPARE REPORT ON TASK 2 STATUS, LACK OF INFORMATION AVAILABLE, FUNDING, ETC., AND WHAT NEEDS TO BE DONE BEFORE THEY CAN FINISH TASK. THEY ARE TO MAKE A RECOMMENDATION TO TAEIG FOR FUTURE PLAN ON TASKING.**

THE TASK 2 REPORT WAS COMPLETED AND TRANSMITTED TO TAEIG

SUMMARY OF TASK 2 REPORT

FOR CLARITY, TASK 2 WAS DIVIDED INTO ITS ELEMENTS, AS FOLLOWS:

2a. Review national transportation safety board recommendations A-96-54, A-96-56, and A-96-58, and advances in ice protection state-of-the-art.

2b. Define an icing environment that includes supercooled large droplets (SLD).

2c. Devise requirements to assess the ability of aircraft to safely operate either

- **i) for the period of time to exit or**
- **ii) to operate without restriction**

In SLD aloft and at or near the surface.

SUMMARY OF TASK 2 REPORT

2d. Devise requirements to assess the ability of aircraft to safely operate either

i) for the period of time to exit or
ii) to operate without restriction

In mixed phase conditions if such conditions are determined to be more hazardous than the liquid phase icing environment containing supercooled water droplets.

2e. Consider the effects of icing requirement changes on 14 CFR part 25 and revise the regulations if necessary.

2f. Consider the need for a regulation that requires installation of a means to discriminate between conditions within and outside the certification envelope.

SUMMARY OF TASK 2 REPORT

A REPORT CONTAINS THE STATUS AND IPHWG RECOMMENDATIONS FOR EACH OF THESE ELEMENTS

Task 2a is complete, except that the review of advances in ice protection state-of-the-art may be considered on-going if and as new developments emerge.

Task 2d may also be considered technically complete.

- **With respect to airplane handling and performance, the IPHWG has not found evidence that mixed-phase conditions are more hazardous than the liquid-phase icing environment containing supercooled water droplets having the same total water content.**

- **No further activity related to mixed-phase conditions is planned in the IPHWG in connection with this task**

SUMMARY OF TASK 2 REPORT

Task 2b: Definition of SLD icing environment

A master SLD database is being prepared by the FAA Technical Center

- **Contains 1993 data miles as of end of year 2000**

This database is considered sufficiently complete as of February, 2001, to proceed with development of an icing environment containing SLD

The group recommends to TAEIG that IPHWG develop at least interim SLD certification standards using the information from the database.

- **May not be a complete revision of the Appendix C envelopes**

- **Should be sufficient to permit generation of ice shapes for use in Task 2c**

The IPHWG believes that interim standards could be completed to concept approval during first quarter of 2002

SUMMARY OF TASK 2 REPORT

Task 2c: Requirements to safely operate in SLD

Completion of this task depends upon:

- **Development of SLD certification standards under task 2b and,**
- **Availability of acceptable engineering tools to demonstrate compliance.**

Preliminary capability for simulating large-droplet conditions exists

- **Rudimentary and not validated**

SUMMARY OF TASK 2 REPORT

Task 2c:

The IPHWG recommends that NASA and the FAA, in collaboration with international partners and private industry, pursue sources of funding to adapt codes, tunnels, and tankers to supply manufacturers and regulatory authorities with validated tools

Recommendations are consistent with task 11c of the April, 1997, FAA in-flight icing plan

. IPHWG recommends activities from FAA icing plan task 11c be targeted to support the completion of IPHWG task 2c

. Should be carried on concurrently with IPHWG work on task 2b

SUMMARY OF TASK 2 REPORT

Task 2e: Consider the effects of icing requirement changes on 14 CFR part 25 and revise the regulations if necessary

- **Applies to determining whether other changes to 14 CFR Part 25 are needed as a result of the new SLD certification requirements developed under Tasks 2b and 2c**

- **Cannot be undertaken until any revision of requirements is at least drafted under Tasks 2b and 2c**

IPHWG recommends proceeding with Task 2e following development of Tasks 2b and 2c to a point sufficient to understand what is required under Task 2e

SUMMARY OF TASK 2 REPORT

Task 2f. Consider the need for a regulation that requires installation of a means to discriminate between conditions within and outside the certification envelope

Task 2f depends on two considerations:

- **Need - is there evidence that some cliff exists at the edges of the current or any future (to be defined) certification envelopes that will endanger an airplane**

- **Feasibility - is there an operationally feasible technology to accomplish this objective**

A technology has been identified which may be capable of detecting the presence of drops above a specified size; however, no mature products exist

SUMMARY OF TASK 2 REPORT

Task 2f.

Understanding these issues depends on the other parts of Task 2, particularly 2b and 2c

No recommendations made to by IPHWG to TAEIG at this time

16TH IPHWG MEETING

16TH IPHWG MEETING HELD AT CAPUA ITALY, MAR 19 - 22, 2001

IN ORDER TO EXPEDITE THE CERTIFICATION RULE PROPOSAL FOR TASK 1, THE FAA PREPARED A DRAFT NPRM AND AC

THE DRAFTS WERE EDITED IN THE GROUP TO CONSENSUS AS FAR AS POSSIBLE

REMAINING ISSUES WILL BE DOCUMENTED IN A REPORT TO TAEIG

THE DOCUMENTS AND THE REPORT ARE INTENDED TO BE SUBMITTED TO TAEIG BY MAY 26, 2001

A VOTE FOR TRANSMITTAL TO FAA WILL BE REQUESTED AT THE JUNE TAEIG MEETING

IPHWG FUTURE MEETING SCHEDULE

JULY 15 - 20, 2001	MONTREAL, QUEBEC, CANADA
OCTOBER 22 - 27, 2001	SWEDEN
FEBRUARY 4 - 8, 2002	TBD, NORTH AMERICA
MAY 20 - 24, 2002	TBD, EUROPE
SEP 9 - 13, 2002	TBD, NORTH AMERICA
DEC 2 - 6, 2002	TBD, EUROPE

EMBRAER HAS OFFERED TO HOST ONE OF THE 2002 IPHWG MEETINGS IN BRAZIL. IS THERE ANY REASON THIS CANNOT BE ACCEPTED IF THE WORKING GROUP AGREES TO IT?

OTHER BUSINESS

THE GROUP UNANIMOUSLY ENDORSES JIM HOPPINS OF CESSNA AIRCRAFT CO AS THE NEXT US CO-CHAIR OF THE IPHWG

CONFIRMATION OF MR. HOPPINS IS REQUESTED EFFECTIVE AT THE OCTOBER IPHWG MEETING